

# PATENT SPECIFICATION

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## COMPLETE SPECIFICATION

### Free Wheeling Hub for Bicycles and the like

I, LUCIEN CHARLES HIPPOLYTE JUY, a French citizen, of 75, Rue du General Fauconnet, formerly of 38, Rue de Metz, Dijon (Côte d'Or), France, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 Free wheels in use in association with hubs in bicycles and the like vehicles are constituted nowadays generally by systems incorporating catches, cams or hooks. Their weight alone forms a considerable drawback.

15 On the other hand, however, these parts are comparatively brittle and it is impossible to use a reduced pitch diameter for the teeth by reason of the large bulk of the mechanism considered. In other respects, it is often useful to be able to take the hub to pieces while leaving the pinions and the chain in their correct position of operation. Hence the necessity of providing a hub having a

25 sufficiently resistant spindle which is, at the same time, consistent with the desired reduced bulk to be given to the arrangement. For these various reasons, it is necessary to design a new device by which this problem is solved.

30 According to my invention, I provide a free wheeling hub for bicycles and the like incorporating means for locking the hub between the frame lugs and for releasing same when required for dismantling without removing

35 the chain pinion, said hub being drivingly connected with the chain pinion carrier through a ratchet wheel, dog clutch or the like arrangement, whereby the hub may continue rotating freely when the rider no longer

40 drives the pinions, by reason of the pinion carrier being laterally shifted through the reaction between the cooperating clutch teeth on the hub and on the pinion carrier and means for retaining the clutch out of engagement

45 when the pedals are stationary.

In accompanying drawings showing, by way of example, an embodiment of the device according to my invention:

Fig. 1 is a general sectional view of the

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free wheel and hub device according to the 50 invention.

Fig. 2 is a sectional view of the brake and associated grooved flange in said device together with a front view of said grooved flange.

Fig. 3 is an outer view of the clutch between the hub and the carrier for the stepped pinions, the clutch being shown to be engaged.

Fig. 4 shows the brake engaging the flange groove in order to make the free wheel 60 operative.

Fig. 5 is similar to Fig. 3 but the clutch between the hub and the stepped pinions is shown in its disengaged position so as to make the free wheel operative.

Fig. 6 includes two views of the arrangement and fitting of the brake in relationship with the grooved flange and pinion carrier.

In the device illustrated, that incorporates a free wheel and a hub; the body of the hub 70 1 is provided with two cups, 2 and 3, screwed into said body but that could as well be secured through other means. Two series of balls, 4 and 5, provide for the easy rotation of the hub body 1 round the two conical 75 bearing members 6 and 7. Said cones are kept at an invariable distance from one another through a tubular spacing member 8. A locking nut 9 allows adjusting the smoothness of running and the clamping of 80 the balls through a more or less considerable screwing-in of the cup 2, the cup 3 being permanently clamped home on the body 1. An axial spindle 10 carrying an operating lever 11 passes through the above described 85 arrangement with some clearance and is screwed inside a tapped hole provided at 12 in the stationary fixture 13. This fixture is rigid with the frame lug 14 and is secured to the latter through any suitable means such 90 as a threaded rod 15 and cooperating nut 16. The spindle 10 passes through the other frame lugs 17 and it is consequently obvious that, if said spindle is caused to rotate in the direction of screwing, this will provide a 95 tightening of the members 11, 17, 6, 8, 7, 13 and 14. Thus the hub will be secured and held firmly between the lugs 14 and 17 without



the tightening thus obtained affecting the smoothness of running. In addition, it is easy to take the system to pieces through a mere rotary action on the lever 11 so as to rock the spindle 10 in the direction of unscrewing. The periphery of the fixture 13 is provided with a race for balls or rollers 18 over which is revolvably carried a ring or the like carrier 19 for the pinions 20, 21, 22. Of course, the bearing between said carrier and the fixture may be provided as well by smooth bushings or the like. The shape of the carrier 19 is such that it may execute a slight lateral shifting with reference to the fixture 13 that serves as a carrier therefor.

The pinion carrier 19 is provided at its outer periphery with a suitable castellation or thread through which one or more chain pinions, 20, 21 and 22 are secured to it permanently; these pinions are drawn along by the driving chain and are held fast on their carrier 19 by means of a terminal locking nut 23.

At its inner end, the pinion carrier 19 is provided with a series of ratchet teeth, a dog clutch or the like, as illustrated diagrammatically at 24 (Fig. 5). The corresponding side of the hub body carries a cooperating clutch or series of teeth 25, in register with the teeth 24, said teeth 24 and 25 facing, of course, opposite directions in space. Fig. 1 shows by way of example, the teeth 25 as cut in the end of the screwed cup 3, but obviously any other means of forming said teeth may be used. The pinion carrier 19 is provided with a brake member 26 (Figs. 2 and 4) that is held in position by a suitable spring or system of springs as illustrated by the small spring 27' (Fig. 6) fitted inside a recess 28 formed in the pinion carrier 19. The brake member 26 is located at a distance such that it may be released with reference to the cooperating part of the fixture 13 when the clutch 24-25 is in engagement during operation of the bicycle pedal. When the cyclist stops pedalling, the pinions and their carrier 19, 20, 21, 22 revolve no longer round the fixture 13. Since the body of the hub 1 continues revolving freely, the reaction that takes place between the cooperating teeth 24, 25 causes them to slide longitudinally over one another whereby the pinion carrier 19 is shifted longitudinally of its fixture 13 within a predetermined distance corresponding to the depth of the teeth. This lateral shifting initiated thus by the cooperating teeth 24, 25 brings the brake member 26 (Fig. 4) into its outer position in which it engages the flange 27 rigid with the fixture 13. This flange 27 is provided at its periphery with a plurality of sloping cuts and grooves in such a way that the engagement of the brake member in said groove provides a slight rotation of the pinion carrier 19 over the

fixture in a direction opposed to the normal drive operated through the bicycle pedals, and this produces a complete disengagement between the teeth 24 and 25. The parts are then in their free wheeling position and the hub rotates without any noise nor any engagement with the pinions 20, 21, 22.

When the cyclist begins to pedal again, he drives the chain and consequently the pinions 20-21-22 in the direction of progression corresponding to normal operation. The 75 brake member 26 slides then in the direction defined by the grooves in the flange 27 and brings thus the teeth 24 and 25 back into engagement. As the pedalling is continued, the clutch comes into full engagement and 80 the brake member 26 returns into its inoperative position for which it is no longer in contact with the flange 27.

As described, the clutch 24-25 provides for the free wheeling and the driving cooperation 85 between the dismountable hub and the pinion carrier which latter is driven by the chain.

The teeth system 24-25 can be concealed by providing for instance at the periphery a 90 case constituted by a thin metal sheet.

Obviously the free wheeling device disclosed may be used without the removable spindle allowing a quick setting up and it would operate in the same manner with a 95 hub having a solid spindle.

What I claim is:—

1. A free wheeling hub for bicycles and the like incorporating means for locking the hub between the frame lugs and for releasing same 100 when required for dismantling without removing the chain pinion, said hub being drivably connected with the chain pinion carrier through a ratchet wheel, dog clutch or the like arrangement whereby the hub may 105 continue rotating freely when the rider no longer drives the pinions, by reason of the pinion carrier being laterally shifted through the reaction between the cooperating clutch teeth on the hub and on the pinion carrier, 110 and means for retaining the clutch out of engagement when the pedals are stationary.

2. A free wheeling hub as claimed in claim 1 wherein the lateral shifting of the pinion carrier is followed by a braking action exerted 115 by a stationary member acting then on a brake member carried by the pinion carrier, the brake member and pinion carrier being returned into their normal position when pedalling is resumed so that the pinion 120 carrier is returned into engagement with the hub.

3. A free wheeling hub as claimed in claim 1 or 2 wherein the hollow hub is fitted over a longitudinally removable spindle threadedly 125 engaging under control of a hand actuated lever, a stationary member revolvably carrying the pinion carrier.

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4. A free wheeling hub as claimed in claim 3 wherein the hub body is rigid at its ends with cup-shaped members of which one is longitudinally adjustable, said cup shaped members forming the outer races of ball bearings the inner races of which are carried by the spindle:

5. A free wheeling hub as claimed in claim 2 wherein the brake member is secured to the pinion carrier through a spring so that the shifting of said pinion carrier under free wheeling conditions engages said brake member inside grooves cut peripherally on a stationary member, the said grooves sloping in a manner such that the cessation of pedalling constrains the braking member

secured to the pinion carrier to move further away laterally from the hub while normal pedalling returns the brake member and pinion carrier back into their normal positions of engagement with the hub.

6. A free wheeling hub for bicycles and the like substantially as described with reference to and as illustrated in accompanying drawings.

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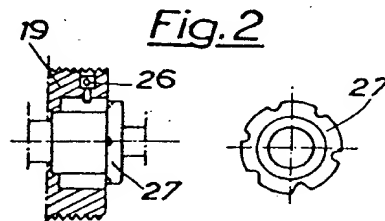
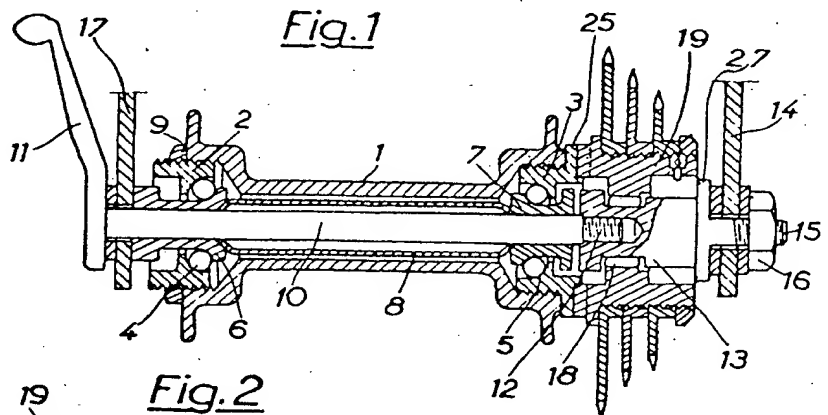


Fig. 3

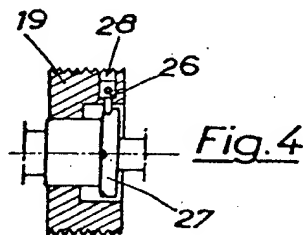
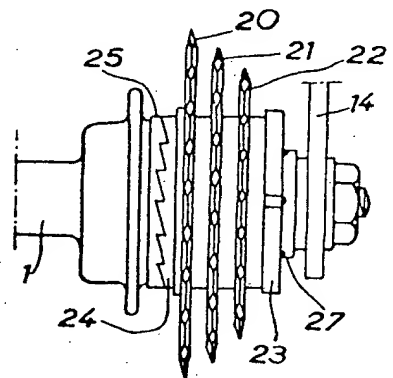


Fig. 5

